Background Material on National Monitoring Network and Relationship to Supersites

The current planned scope of the national $PM_{2.5}$ network consists of three major components: Mass monitoring, routine chemical speciation and supersites. The following brief description of the first two of these components is intended to provide background for understanding the context and relationship of the supersites program. The information also is summarized in the attached table that outlines for each category below a synopsis of the number, major purpose, and potential flexibility for integration with PM research programs.

MASS MONITORING (1100)

1. **Core mass monitoring (850)**. Approximately 850 NAMS/SLAMS sites, required according to EPA guidance to the States, will be dedicated to mass monitoring. A breakdown of these 850[1] sites includes 750 required for NAAQS compliance and 100 sites for characterizing background and transport. The regulation requires a continuous sampler to be collocated with an FRM/FEM at the 52 largest cities (greater than 1,000,000 population).

2. **Mass samplers for spatial averaging and special purpose monitoring (SPM)(200)**. Roughly 200 additional sites to accommodate spatial averaging[2] and special purpose monitoring needs are expected to be deployed. The SPM sites are those established to identify unique source location or communities, and are not required to be compared to the NAAQS if operating less than 2 years (or a sampler without FRM/FEM designation).

3. **Continuous monitoring (50)**. In addition to the required collocated 52 continuous monitors, plans include deployment of an additional 50 continuous samplers. Collectively, at least 100 continuous samplers will be deployed, and probably more, since the States can elect to purchase and operate continuous samplers for sites designated as special purpose monitoring.

*Principal objectives for mass monitoring***:**

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[1] EPA network guidance (40CFR58) requires 850 NAMS/SLAMS sites; however, 100 of those sites are to be designated as background or transport sites (2 per State) which can use the IMPROVE sampler, which is not designated as an FRM/FEM and therefore would not be used for NAAQS comparisons.

[2]The annual $PM_{2.5}$ standard is specified as reflecting an area-wide distribution or spatial average of a representative single monitor or the average of multiple monitors. States have requested additional monitors to provide for spatial averaging.

(a) FRM/FEM samplers and NAMS/SLAMS. The primary objective for mass monitoring, especially the designated NAMS/SLAMS[1] sites is for comparison to the $PM_{2.5}$ NAAQS. In addition, 100 NAMS/SLAMS will serve as background and transport sites, integrated with other efforts such as IMPROVE, to characterize regional transport and background concentrations.

(b) Continuous samplers. Continuously operating samplers will provide a real time estimate of $PM_{2.5}$ levels and allow for input into public information displays (similar to current ozone mapping efforts that reach local weather forecast venues) as well as the Pollutant Standards Index (PSI). Other objectives for continuous samplers include developing statistical relationships with FRM/FEM's to serve as potential surrogates for compliance indicators, and characterizing diurnal patterns of exposure and emissions.

(c) Special Purpose Monitors (SPM's). The SPM samplers are intended to provide flexibility for State and local agencies to investigate areas that may have exceedances without the repercussion of regulatory requirements associated with a NAAQS violations. The purpose of SPM's is to encourage monitoring where it might otherwise be discouraged due to fear of associated regulatory requirements. The SPM's are expected to be located in unique or rural communities subject to localized sources, or enhance the regional/background/transport network to better characterize multiple spatial scale interactions. Samplers for SPM purposes can be FRM/FEM that operate less than 2 years, or non- FRM/FEM samplers. Many State and local agencies are expected to operate continuous samplers within the classification of SPM sites.

ROUTINE CHEMICAL SPECIATION (300).

The routine chemical speciation program consists of two components: 50 required NAMS, and 250 additional sites (EPA's contribution to the IMPROVE program technically is similar to the routine speciation program but addressed separately due to budget considerations).

1. **NAMS (50)**. The regulation requires 50 speciation sites across the country, located mostly in urban areas (e.g., all PAMS cities will have a speciation site). These 50 sites will be designated as NAMS and will follow sampling and analysis protocols similar to the existing Interagency Monitoring of Protected Visual Environments (IMPROVE) program. Filter sampling techniques (teflon, nylon and quartz media) for 24-hour periods every 6 days will be analyzed for principal mass components: most elements through X Ray Fluorescence; major ions through Ion Chromatography/Colorimetry (nitrates, sulfates, chloride/ammonium); and organic and elemental fractions of carbon through Thermo analysis. Prescriptive protocols for sampler selection, analytes, and sampling frequency will be adhered to ensure national consistency across space and time (long-term trends).

2. **Other "Routine" Speciation Sites (250)**. In addition to the NAMS, resources are expected to be available to support approximately 250 additional sites. These sites will be less prescriptive than the NAMS and will be subject to a balance between competing needs for national consistency (50 sites are not adequate to characterize the U.S.) and flexibility to address local-specific issues such as winter time wood smoke, which might require more intensive seasonal sampling and analysis. This component of the program does provide true flexibility for State and local agencies. Certain States (e.g., California) have expressed an interest in establishing more advanced methods capable of in-situ, near continuous measurements of principal species. Given the flexibility of this component of the National program, substantial opportunity exists to interact with the health and atmospheric chemistry research communities. With the exception of the supersites program, however, all of these components are funded by State Grants, which provide hardware and related capitol costs, laboratory analyses, and salaries for State and local agencies to operate the network. Consequently, the dialogue must involve EPA, State and local agencies, and the research community.

3. **IMPROVE Sites (108)**. In addition to 30 existing EPA supported sites, 78 new IMPROVE sites are being added, in Class I or representative areas, to address the requirements of the forthcoming Regional Haze regulations. These sites conduct speciation sampling similar to the 50 NAMS, but on a 1/3 day sampling interval. These sites are considered as part of the entire $PM_{2.5}$ National network, recognizing that the technical connections (e.g., sources/ambient characterizations, measurement techniques) between $PM_{2.5}$ and visibility require integration. Although funded through State Grant funds, this program is managed by the IMPROVE Steering Committee, and most of the technical work conducted by Universities and the Federal Land Managers.

SUPER SITES (4-7). In addition to the above, EPA is planning to establish 4 to 7 sites with research grade physico-chemical instrumentation. These are discussed elsewhere.

List of Acronyms

$PM_{2.5}$ = Particles with an aerodynamic diameter less than or equal to a nominal 2.5 micrometers
PM = Particulate Matter
EPA = Environmental Protection Agency
NAMS = National Air Monitoring Station
SLAMS = State/Local Air Monitoring Station
NAAQS = National Ambient Air Quality Standards
FRM = Federal Reference Methods
FEM =Federal Equivalency Methods
SPM = Special Purpose Monitoring
IMPROVE = Interagency Monitoring of Protected Visual Environments
PSI = Pollutant Standards Index